UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF COMMERCIAL FISHERIES

CALIFORNIA FISHERY MARKET NEWS MONTHLY SUMMARY

February 1966

PART II–Fishing Information*

Sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists

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EL NIÑO OFF SOUTH AMERICA

The widely-celebrated oceanic disturbance known as El Niño appears to have visited the offshore waters of Ecuador and Peru again. Noteworthy El Niños in recent historical times took place in 1891, 1925, 1941, 1953, and 1957-58. Each previous visitation of El Niño has been accompanied by unusually high sea surface temperatures, abnormally heavy coastal rainfall, mass die-offs of guano birds associated with the unavailability of their primary food source, the anchoveta (Engraulis ringens), and southward movement of tropical species of fish (yellowfin tuna and dolphin), hammerhead sharks and manta rays.

The Tuna Resources Laboratory staff has observed a gradual anomalous rise in South American west coast sea temperatures for the past few months, and has also received occasional fragments of information which seemed to indicate an El Niño was developing. The first real evidence appeared during the southern summer of 1965 when coastal temperatures averaged from 1°-3° F. above normal. Last October, word came from Chile that the Instituto de Fomento Pesquero was staging an "El Niño cruise", and that the September fish landings were less than 1/10 of the amount landed in the same month in 1964. Heavy rains and flooding were reported to be widespread, and some coastal stations reported precipitation totals which had not been exceeded for more than 30 years.

In addition to the reports filtering in from South America, we have witnessed an anomalous southward movement of the 80° F. isotherm since November 1965. In February 1966, the 80° isotherm extended well below the equator into the offshore region of Ecuador and Peru to about 8° S. latitude, and from about 83° W. longitude to 97° W. longitude. Normally the 80° isotherm does not appear below the equator until March. This anomaly appeared first in January 1966, and has intensified since that time. Warmer-than-normal temperatures have been observed in the general area since November, 1965. These developments are significant, for it is in this area that the cold upwelled waters of the Peru Current generally turn offshore to the northwest.

Inshore temperatures along the coast of Ecuador and Peru to about 7° S. latitude do not show definite warm anomalies. From 7° to 15° S. latitude the February data show a normal to warmer-than-normal trend and data from southern Peru and Chile indicate cooler-than-normal temperatures, and are cooler than February 1965. This evidence suggests that the warm

anomalies experienced so far this year are more local than widespread along the immediate coast. The pool of warm surface water to the west of Ecuador and Peru, however, is large; if it intensifies and moves inshore, the coast of Peru may experience temperatures approaching those of last year during March and April.

Thermal conditions monitored at La Libertad and Puerto Chicama, Peru during 1964-65 have provided the opportunity for comparison with those of 1957-58, the last reported El Niño. Temperatures were observed to rise last year during the southern summer, but were not as high as were observed in 1957 (see cut). In fact, our inability to determine whether or not El Niño was approaching this year may be reflected in the data from both stations to date: sea temperatures were colder in 1956 than in 1964, the years preceding onset of El Niño; and the magnitude of warming in 1957 was greater than that observed in 1965. Preliminary data for the month of February suggest that, up to the present time, sea conditions this year are somewhat cooler than during the equivalent period in 1958. Thus, if this trend prevails for the remainder of the year, the 1965-66 El Niño may well be less intense than in 1957-58, and , indeed, may be shorter in duration.

South American fishery interests are watching developments closely. Peru has established a limited anchovy fishery not to exceed 7 million metric tons for the year ending June 30 1966, and has decreed a closed season on the species from July 1 to September 30, 1966.

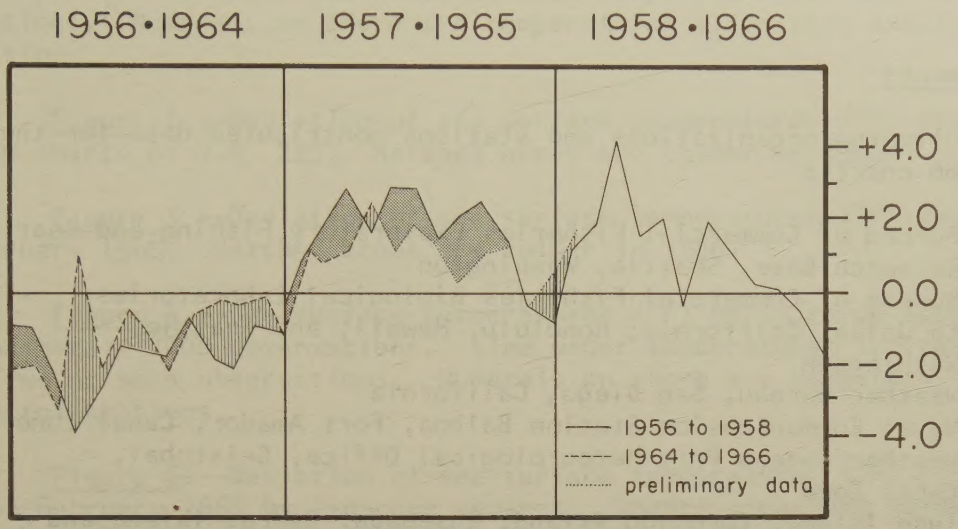
As in other El Niño occurrences, tuna fishermen will find the tropical tunas more widely scattered than usual and that they may extend further poleward at the extremes of their range. (Yellowfin tuna were taken by seiners off Chimbote, Peru in February in an area which is farther south than normal for this time of year.) Yellowfin and skipjack tuna may be less abundant than usual off Central America as the Northern Hemisphere summer season develops.

The U.S. purse seine fleet is now widely scattered between Cape San Lazaro, Baja California, Mexico, to near 10° S. latitude. If the warm anomaly continues to develop in the Central America-Mexico offshore region (see fig. 6), further normal seasonal warming can be expected to aid its development and extension into northern waters, and results in the displacement of the yellowfin and skipjack tuna farther to the north than usual. We may see yellowfin tuna catches off southern California this coming summer as we did in 1959.

Glenn A. Flittner
Fishery Biologist (Research)

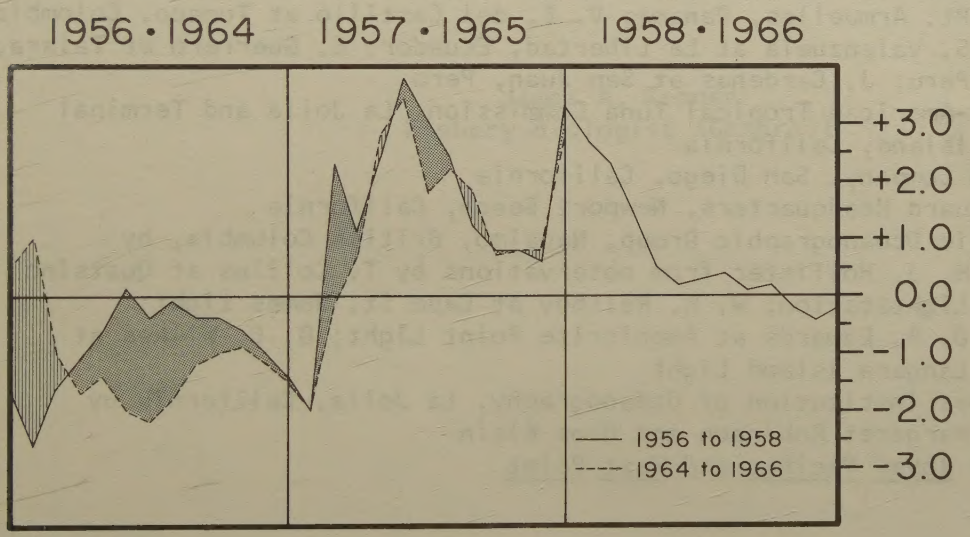
LA LIBERTAD, PERU

Sea Surface Temperature Anomaly (°F.)



PUERTO CHICAMA, PERU

Sea Surface Temperature Anomaly (°C.)



Sea surface temperature anomalies observed at La Libertad and Puerto Chicama, Peru, 1956-58 and 1964-66. Stippled area indicates 1964-66 period colder than 1956-58; hatched area indicates 1964-66 period warmer than 1956-58.

SEA SURFACE TEMPERATURE CHARTS, EASTERN PACIFIC OCEAN

FEBRUARY 1966

Acknowledgements

The following organizations and stations contributed data for the February 1966 charts:

U.S. Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base, Seattle, Washington
U.S. Bureau of Commercial Fisheries Biological Laboratories, La Jolla, California; Honolulu, Hawaii; and Seattle, Washington
U.S. Weather Bureau, San Diego, California
U.S. Naval Communication Station Balboa, Fort Amador, Canal Zone
U.S. Weather Bureau Port Meteorological Office, Cristobal, Canal Zone
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Inter-American Tropical Tuna Commission, La Jolla and Terminal Island, California
Kelco Company, San Diego, California
Lifeguard Headquarters, Newport Beach, California
Pacific Oceanographic Group, Nanaimo, British Columbia, by H. J. Hollister from observations by T. Collins at Quatsino Lightstation; W. R. Raithby at Cape St. James Light; O. A. Edwards at Amphitrite Point Light; G. C. Wilkes at Langara Island Light
Scripps Institution of Oceanography, La Jolla, California by Margaret Robinson and Hans Klein
Ships Royal Pacific and West Point

Charts

Figure 1.--Mean sea surface temperatures (°F) derived from approximately 8000 observations. Squares show temperatures at weathership stations. Numerals on shore are temperatures at coastal and lightship stations.

Figure 2.--Deviation of sea surface temperatures (°F) from long term charts of H.O. 225. Hatched areas are colder in 1966.

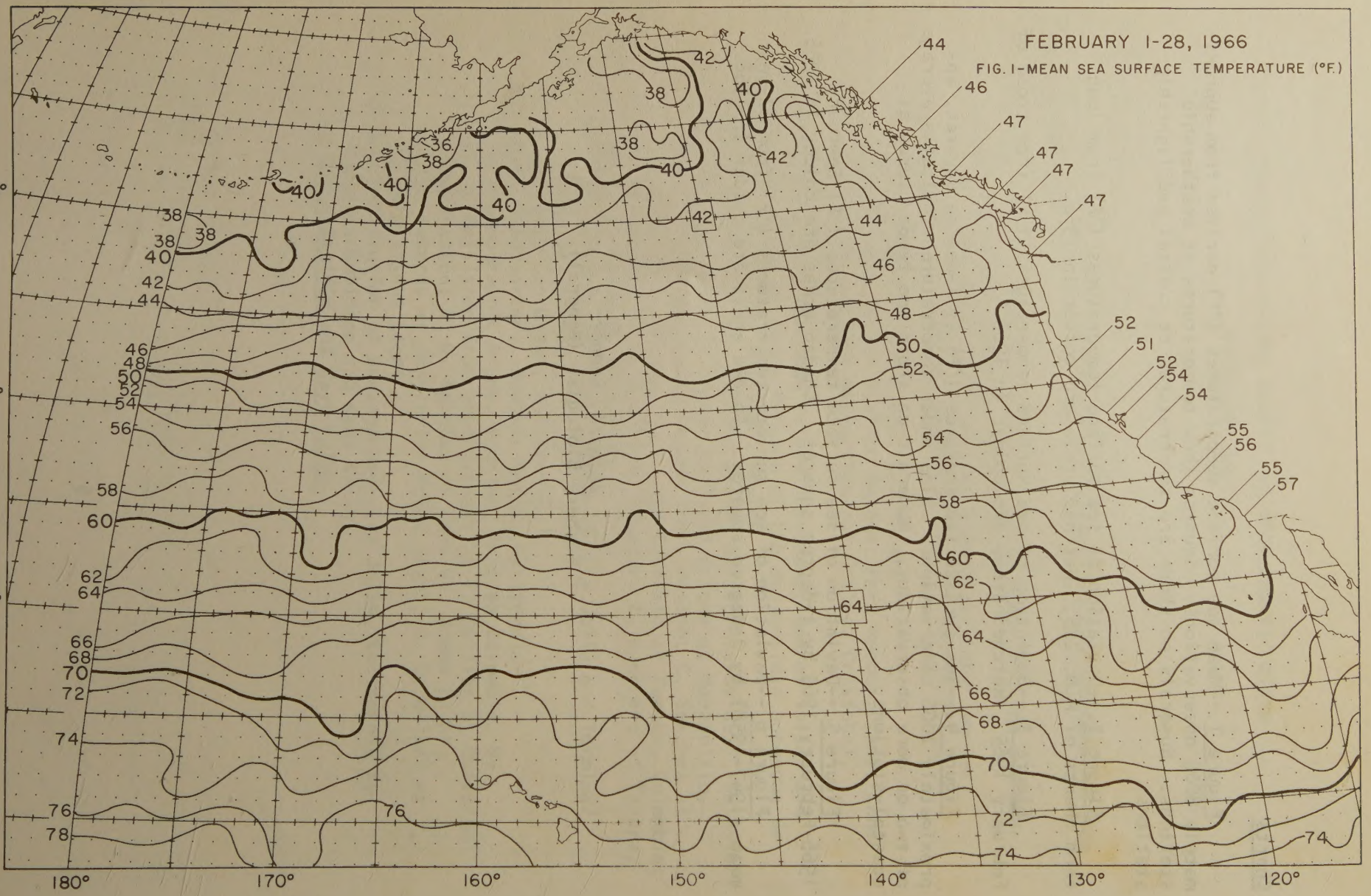
Figure 3.--Deviation of sea surface temperatures (°F) from those of February 1965. Hatched areas are colder in 1966.

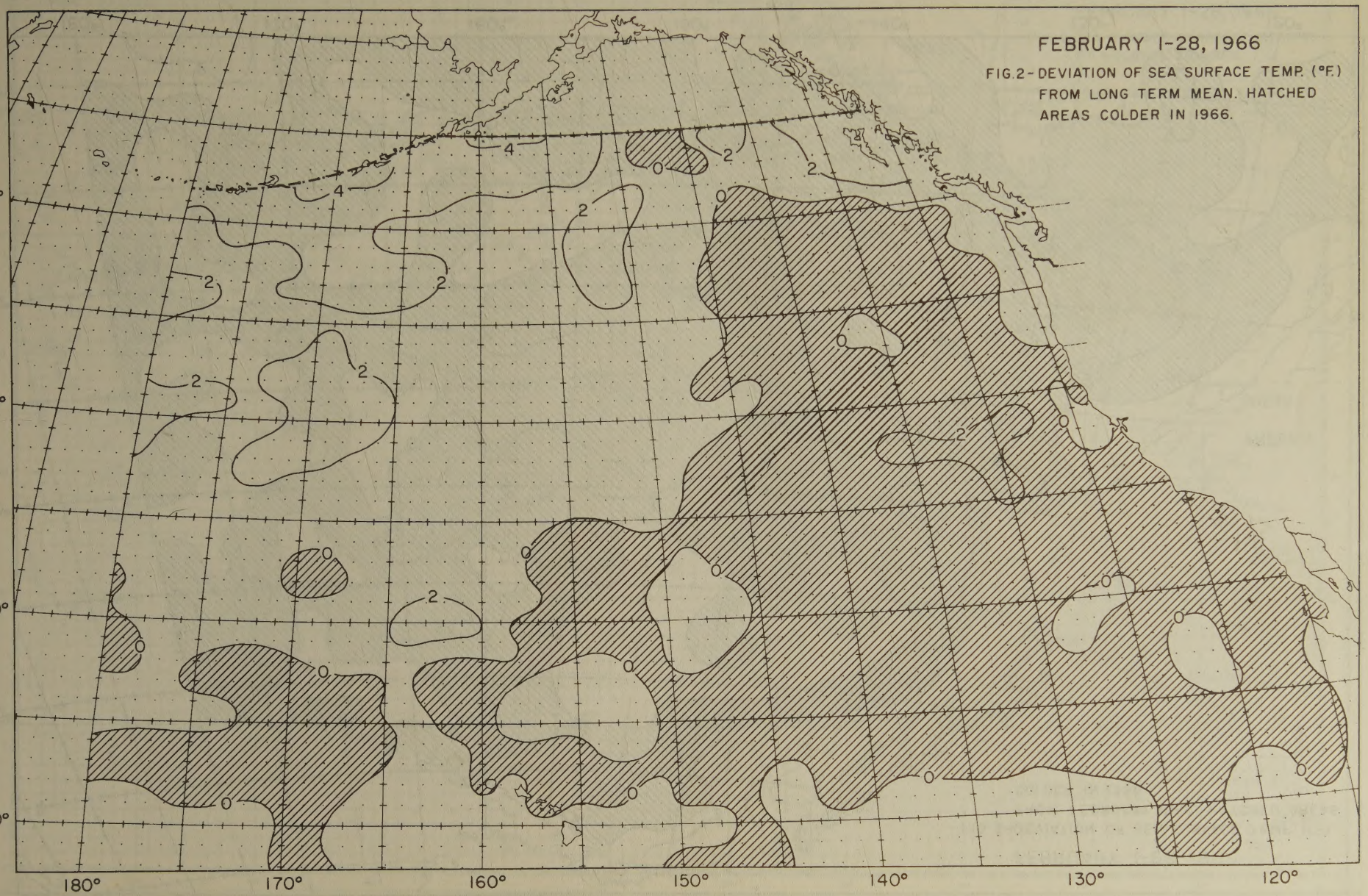
Figure 4.--Sea surface temperatures (°F) by 1-degree squares, approximately 2000 observations. Line under temperatures indicates average of two or more observations. Numerals on shore are temperatures at coastal stations.

Figure 5.--Deviation of sea surface temperatures (°F) February 1966-February 1965 by 1-degree squares. Shaded areas are colder in 1966.

Figure 6.--Deviation of sea surface temperatures (°F) from 12-year mean (1947-1958) by 2-degree squares. Shaded areas are colder in 1966.

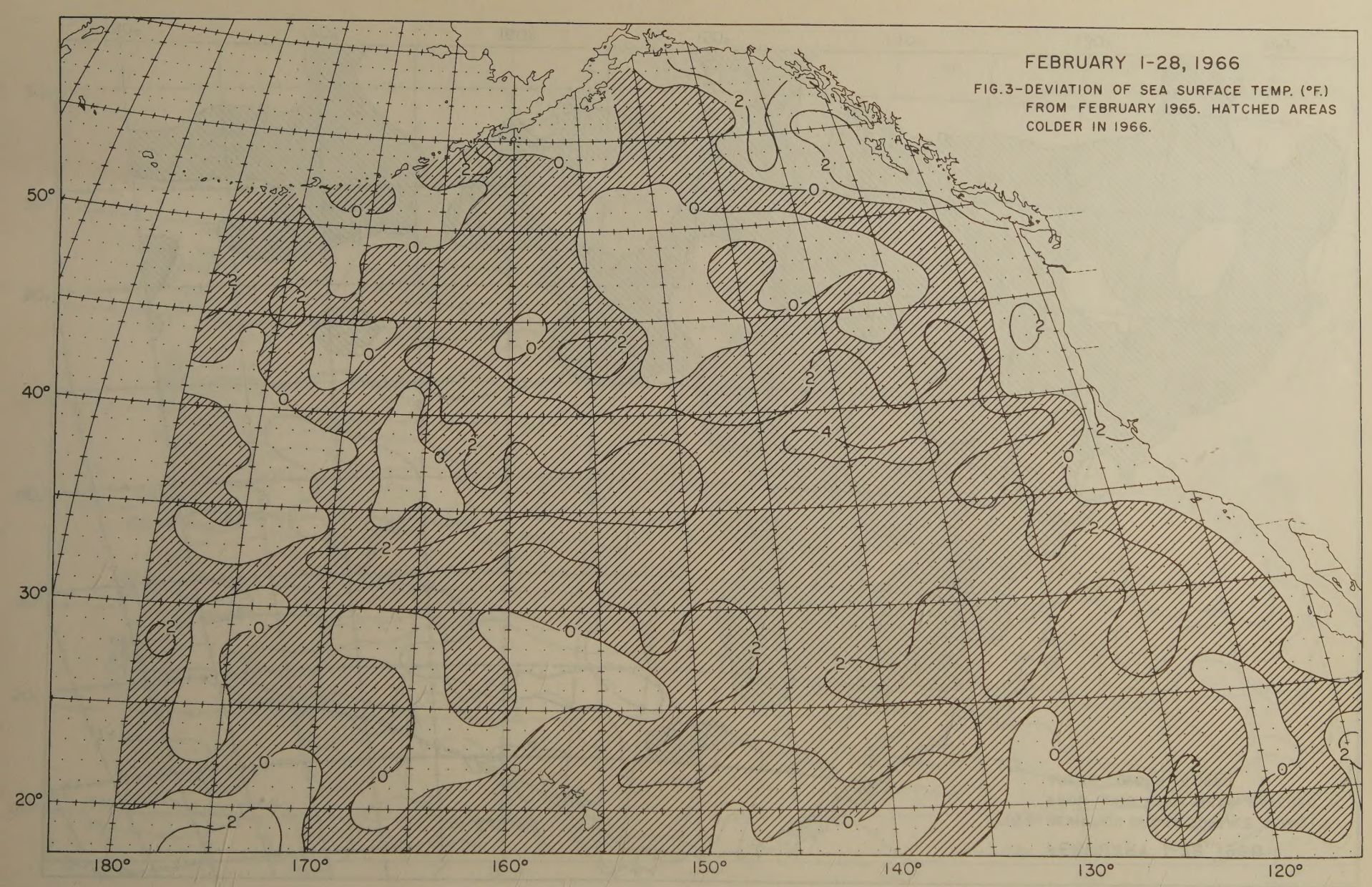
James A. Renner
Fishery Biologist (General)

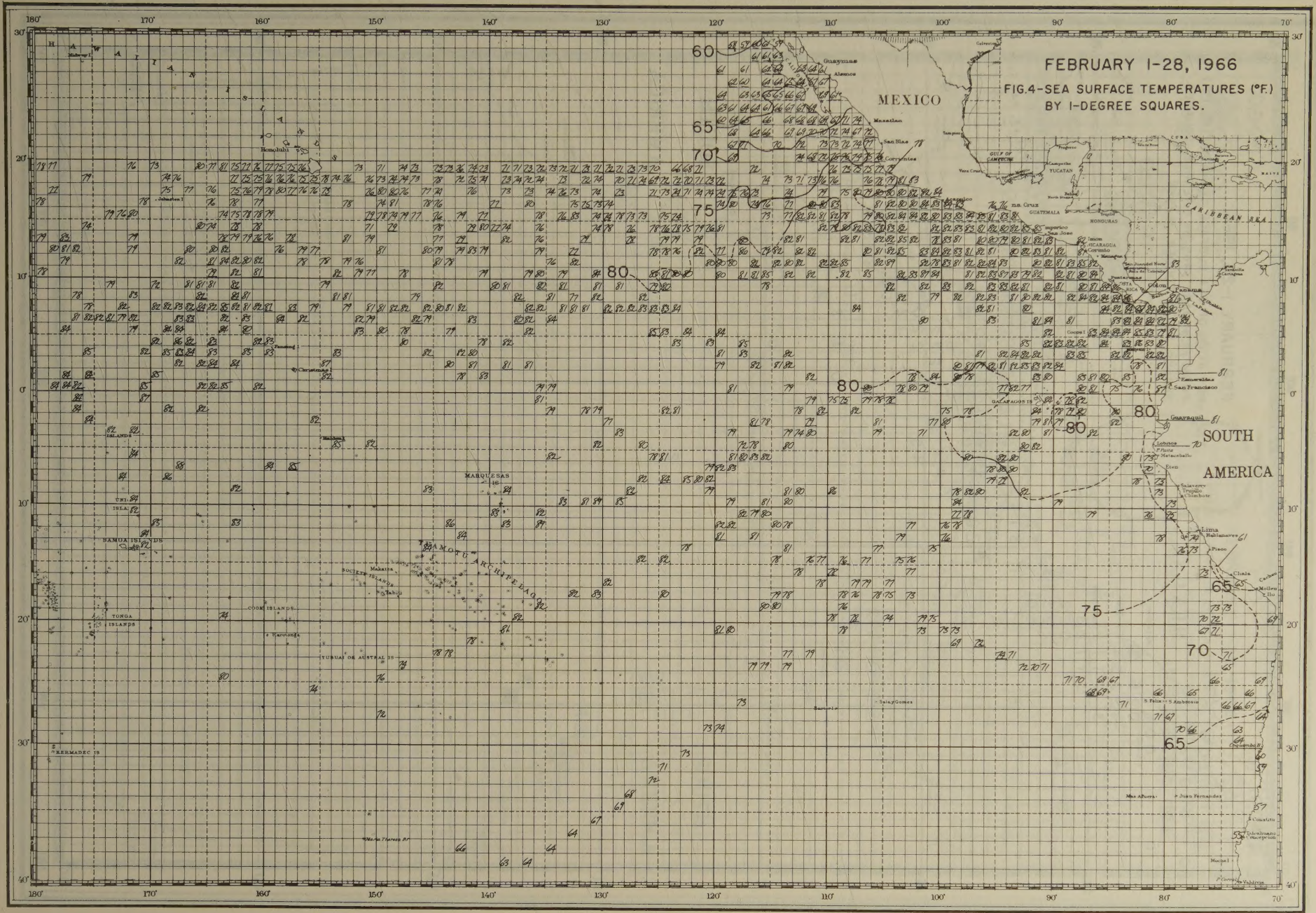

FEBRUARY 1-28, 1966
FIG. 1-MEAN SEA SURFACE TEMPERATURE (°F.)
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°

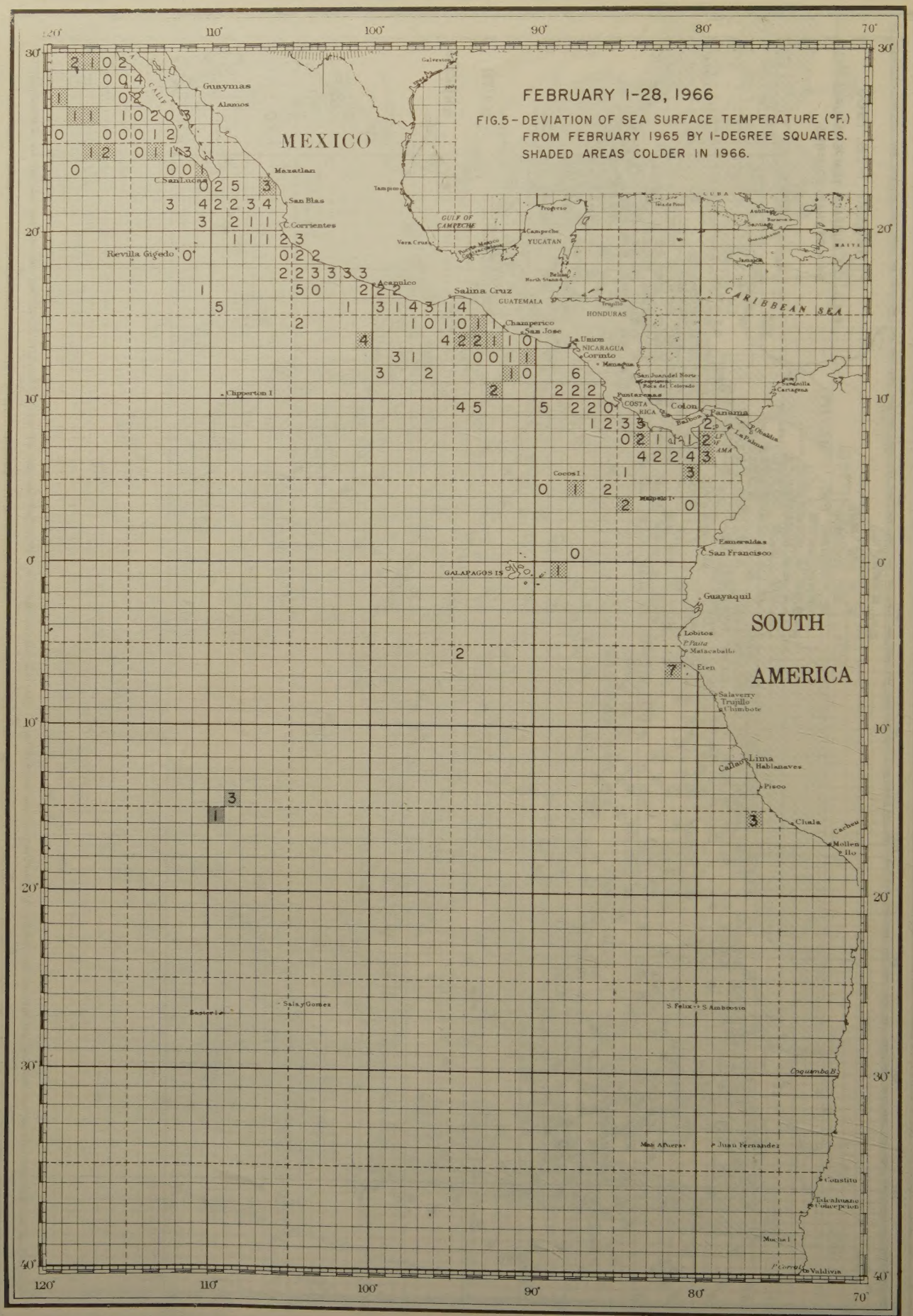


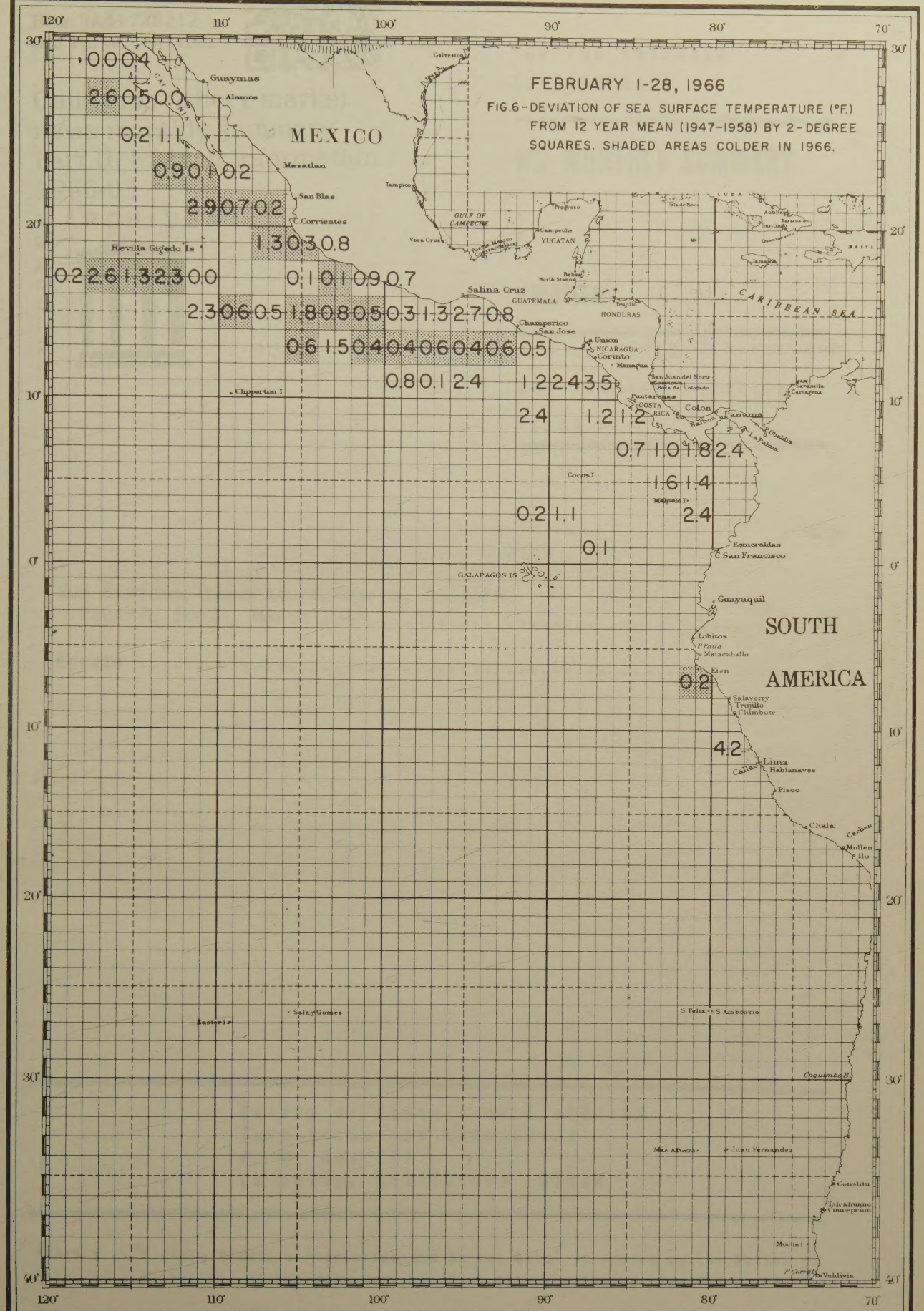
FEBRUARY 1-28, 1966

FIG.2- DEVIATION OF SEA SURFACE TEMP. (°F.) FROM LONG TERM MEAN. HATCHED AREAS COLDER IN 1966.


FEBRUARY 1-28, 1966
FIG.3-DEVIATION OF SEA SURFACE TEMP. (°F.) FROM FEBRUARY 1965. HATCHED AREAS COLDER IN 1966.
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°


FEBRUARY 1-28, 1966
FIG.4-SEA SURFACE TEMPERATURES (°F.)
BY 1-DEGREE SQUARES.
MEXICO
SOUTH
AMERICA
CARIBBEAN SEA
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
CUBA
YUCATAN
GULF OF CAMPECHE
GALAPAGOS IS
MARQUESAS
SAMOA ISLANDS
TONGA ISLANDS
COOK ISLANDS
SOCIETY ISLANDS
TUBUAI OR AUSTRAL IS
KERMADEC IS
Honolulu
Christmas
Tahiti
Rarotonga
Guaymas
Mazatlan
San Blas
Acapulco
Salina Cruz
Guayaquil
Lima
Callao
Pisco
Chala
Salaverry
Trujillo
Chimbote
Esmeraldas
San Francisco
Juan Fernandez
Mas Afuera
Valdivia
60
65
70
75
80


FEBRUARY 1-28, 1966
FIG.5 - DEVIATION OF SEA SURFACE TEMPERATURE (°F.) FROM FEBRUARY 1965 BY 1-DEGREE SQUARES. SHADED AREAS COLDER IN 1966.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CAMPECHE
YUCATAN
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
PANAMA
CUBA
HAITI
JAMAICA
GALAPAGOS IS
Guaymas
Alamos
Mazatlan
San Blas
Corrientes
Revilla Gigedo
Acapulco
Salina Cruz
Champerico
San Jose
La Union
Corinto
Managua
Punta Arenas
Colon
Panama
Clipperton I
Cocos I
Malpelo I
Esmeraldas
San Francisco
Guayaquil
Lobitos
Talara
Matacaballo
Eten
Salaverry
Trujillo
Chimbote
Callao
Lima
Huacho
Pisco
Chala
Cachoeu
Mollendo
Ilo
Easter I
Sala y Gomez
S. Felix
S. Ambrosio
Coquimbo
Mas Afuera
Juan Fernandez
Constitu
Talcahuano
Concepcion
Mocha I
Corral
Valdivia
120°
110°
100°
90°
80°
70°
30°
20°
10°
0°
40°


FEBRUARY 1-28, 1966
FIG.6-DEVIATION OF SEA SURFACE TEMPERATURE (°F.) FROM 12 YEAR MEAN (1947-1958) BY 2-DEGREE SQUARES. SHADED AREAS COLDER IN 1966.
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CAMPECHE
GALAPAGOS IS
Guaymas
Alamos
Mazatlan
San Blas
C Corrientes
Revilla Gigedo Is
Salina Cruz
Champerico
San Jose
La Union
Corinto
Managua
Chippertan I
Punta Arenas
COSTA RICA
Colon
Panama
Balboa
La Palma
Obaldia
Cocos I
Esmeraldas
C San Francisco
Guayaquil
Lobitos
Talara
Matacaballo
Eten
Salaverry
Trujillo
Chimbote
Lima
Callao
Hablamaves
Pisco
Chala
Cachau
Mollendo
Ilo
Sala y Gomez
Easter I
S Felix
S Ambrosio
Coquimbo
Mas Afuera
P Juan Fernandez
Constitu
Talcahuano
Concepcion
Mocha I
Corral
Valdivia
0 0 0 4
2 6 0 5 0 0
0 2 1 1
0 9 0 1 0 2
2 9 0 7 0 2
1 3 0 3 0 8
0 2 2 6 1 3 2 3 0 0
0 1 0 1 0 9 0 7
2 3 0 6 0 5 1 8 0 8 0 5 0 3 1 3 2 7 0 8
0 6 1 5 0 4 0 4 0 6 0 4 0 6 0 5
0 8 0 1 2 4
1 2 2 4 3 5
2 4
1 2 1 2
0 7 1 0 1 8 2 4
1 6 1 4
0 2 1 1
2 4
0 1
0 2
4 2